

Community Salmon Investigation (CSI) for Highline: 2017 Results

Matt Goehring
Miller-Walker Basin Steward



What is the 8-yr average for coho pre-spawn mortality in Miller & Walker Creeks?

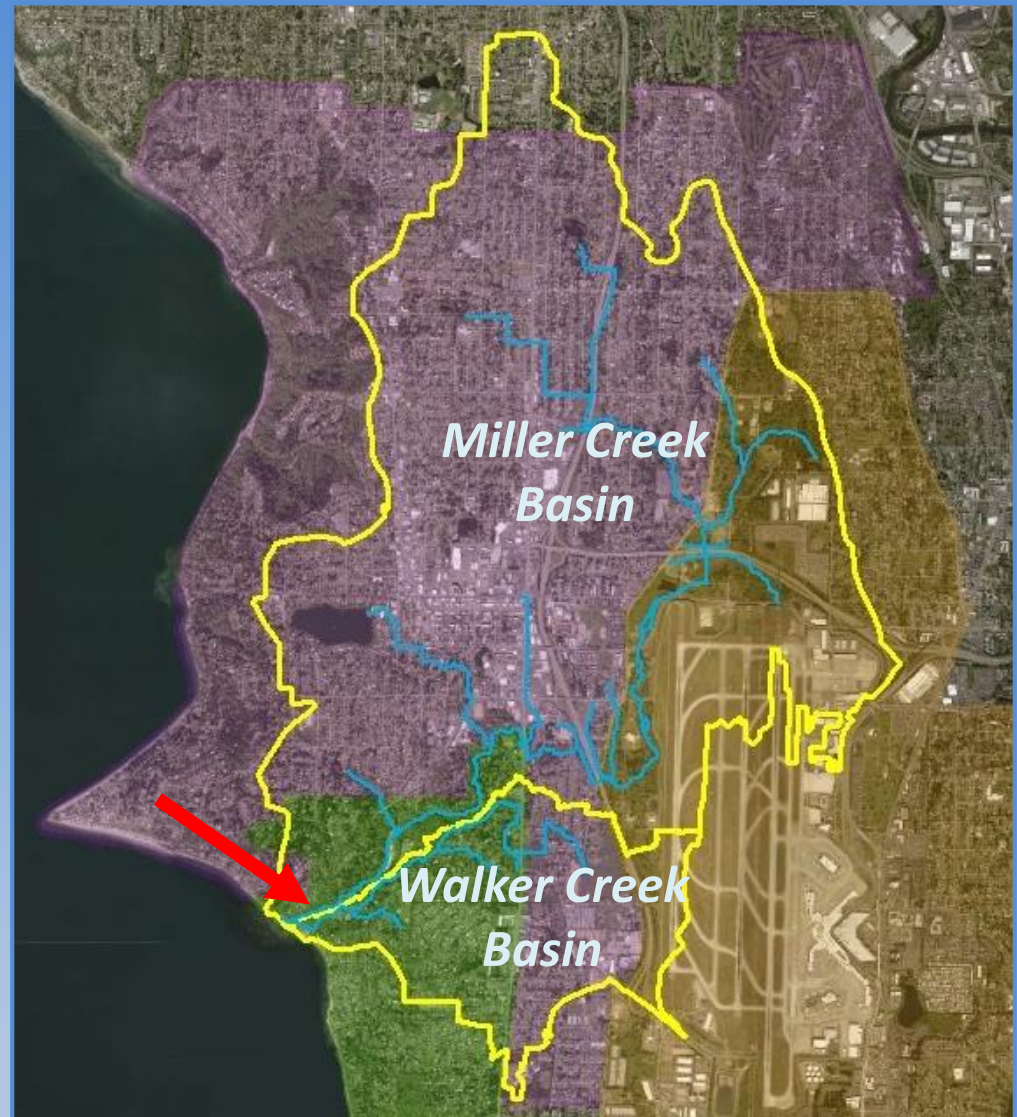
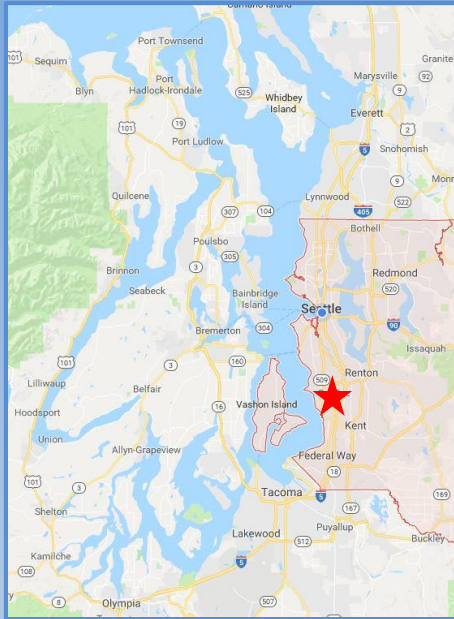


Complete the slip and place
in the bucket.

CSI – Highline: 2017 Results

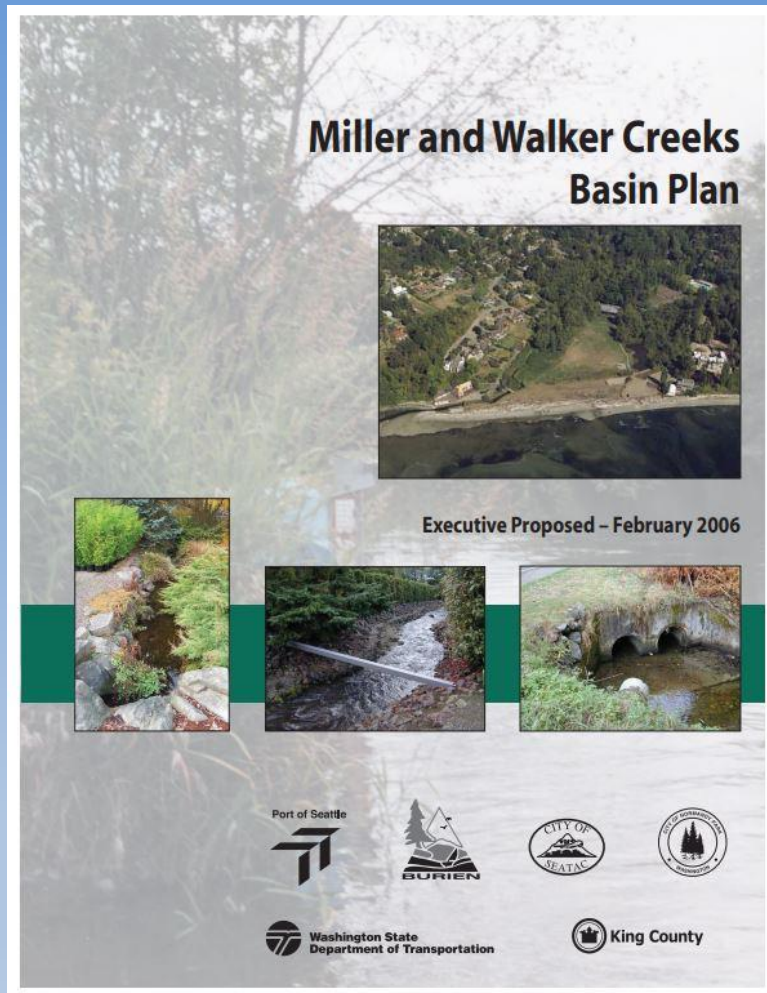
- Background
- Program Overview
- Surveys Results
- Emerging Science
- How You Can Get Involved!

Miller-Walker Stewardship Program



Miller Walker Basin - Local partners working together for clean water and healthy streams

Miller-Walker Basin Planning



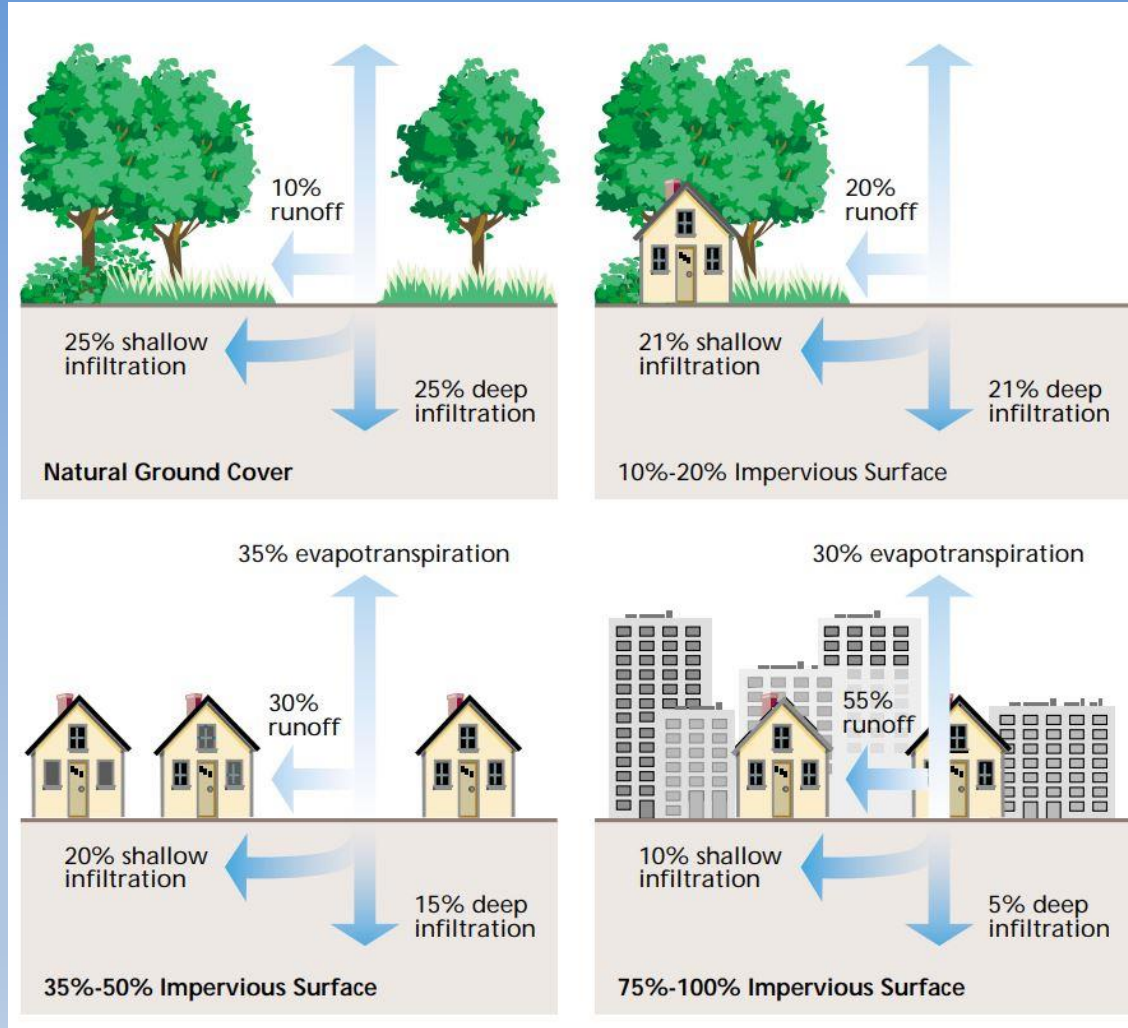
Basin Plan, 2006



**Monitoring Workshops
Burien , 2008**

Miller Walker Basin - Local partners working together for clean water and healthy streams

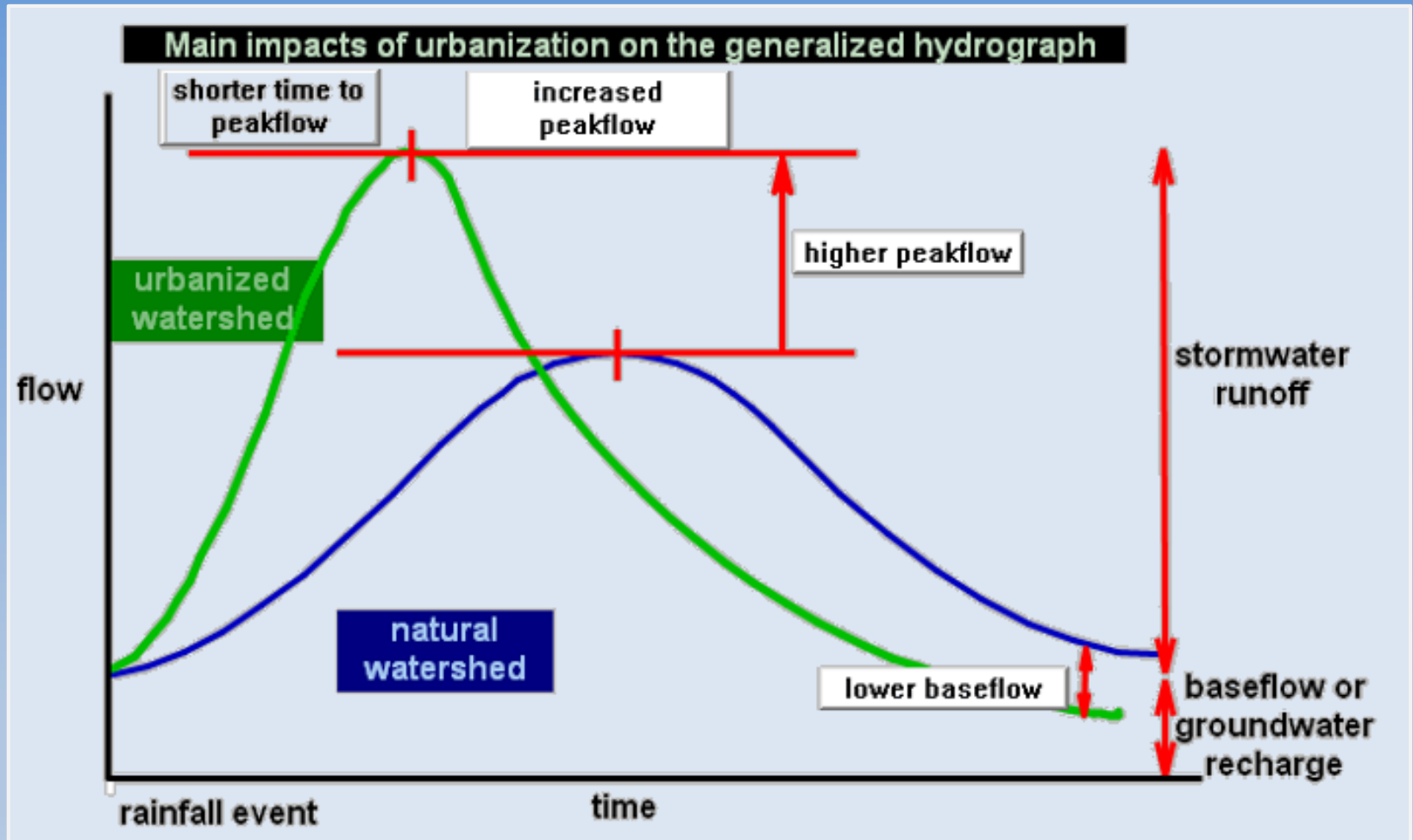
Urban Development



Federal Interagency Stream Restoration Working Group

Miller Walker Basin - Local partners working together for clean water and healthy streams

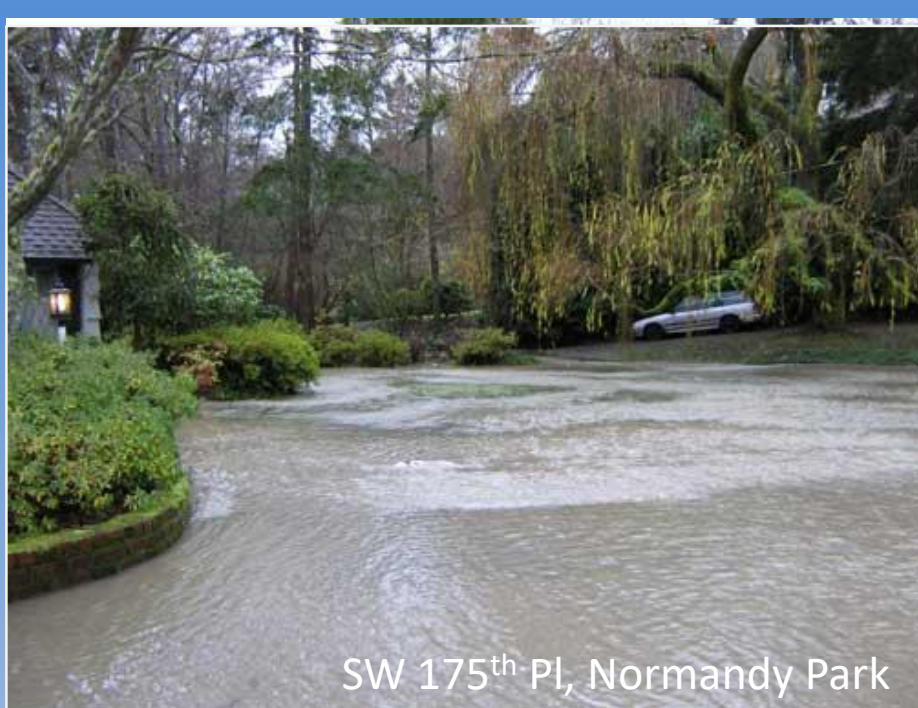
Urbanization & Stream Flow



University of British Columbia



144th St Burien



SW 175th Pl, Normandy Park



NP Swim Club



December 3, 2007

The Cove



Stormwater Runoff Pollutes



Runoff
from Roof

Runoff
from
Gutters

Runoff
from
Street

RUNOFF PICKS UP:

- Pet Waste
- Fertilizers
- Motor Oil
- Detergents
- Chemicals
- Litter

STORMWATER RUNOFF
CARRIES POLLUTANTS
INTO OUR WATERWAYS.

Why do CSI: Highline?

Salmon = ecosystem indicators

Assess “pre-spawn mortality”

Community awareness

Salmon Life Cycle



Photo by Hans Berge

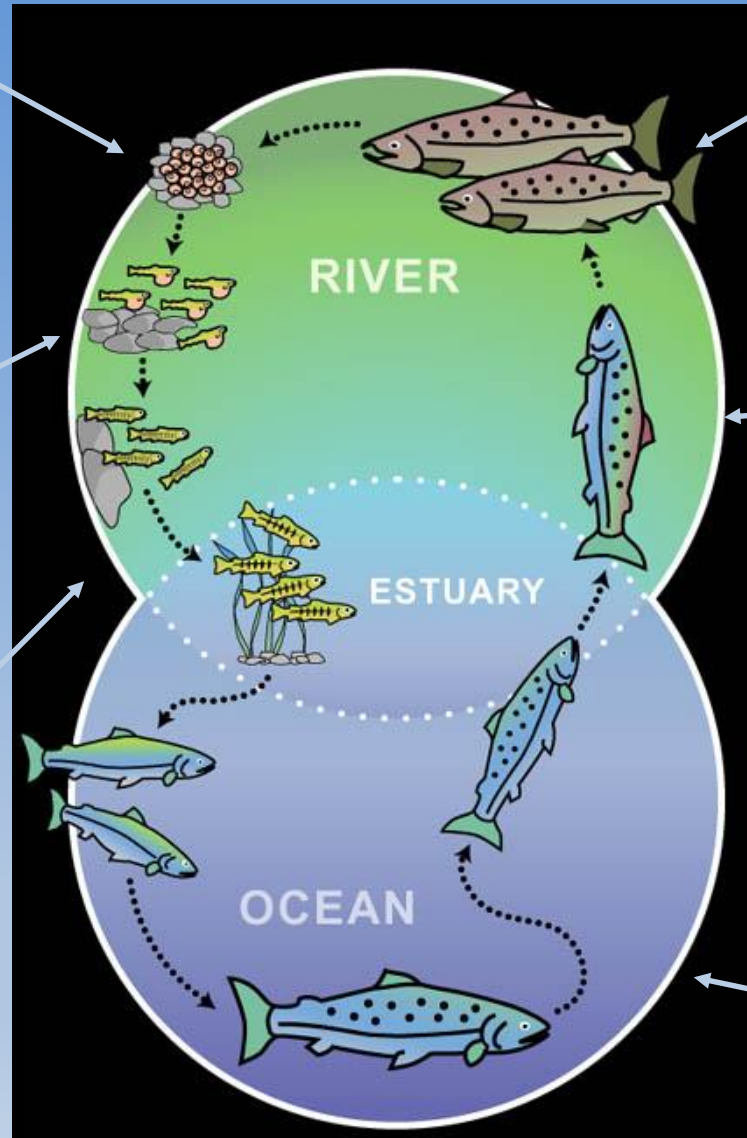


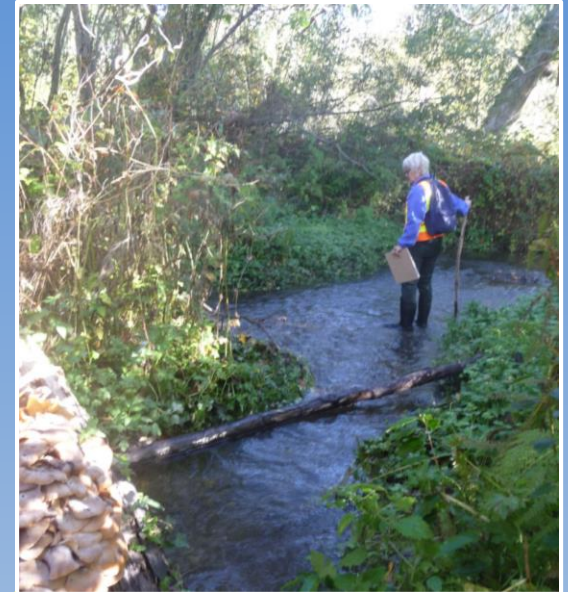
Photo by Al Solonsky

Miller Walker Basin - Local partners working together for clean water and healthy streams

Where? Miller and Walker Creek



Community Driven Effort

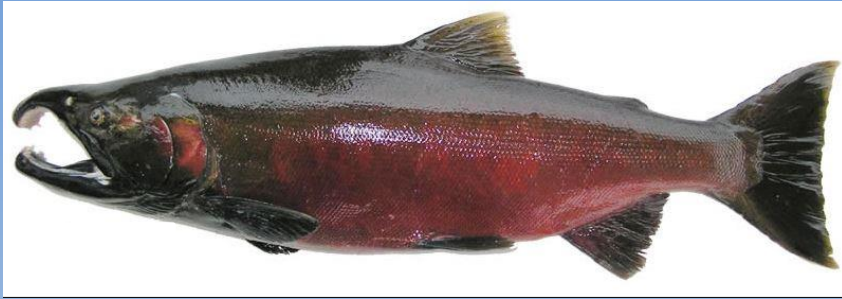


30+ volunteers and
over 335 hours!!!

Miller Walker Basin - Local partners working together for clean water and healthy streams

What type of Salmon are in Miller and Walker Creeks?

Coho



17- 38 in

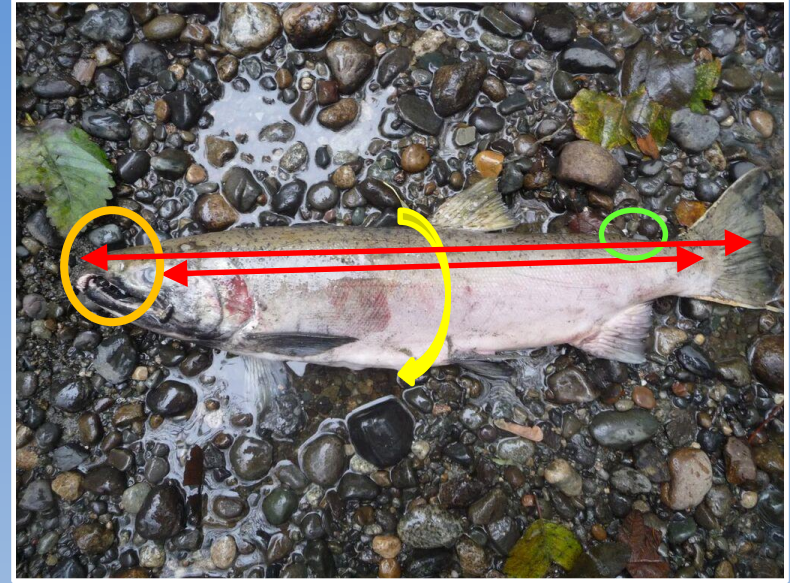
Chum



30-42 in



Data Collection





Spawning Salmon

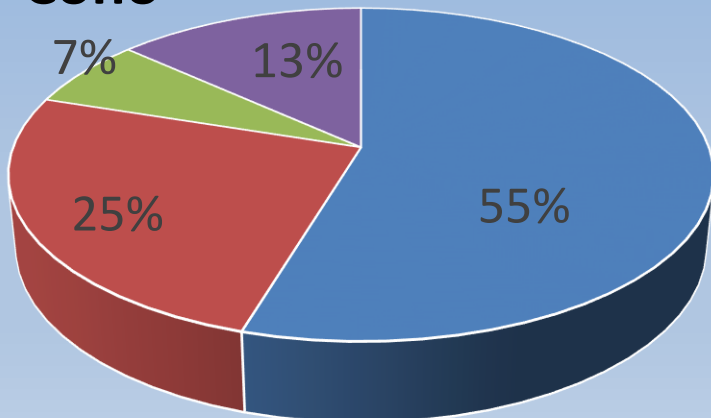


Nov. 4, 2017

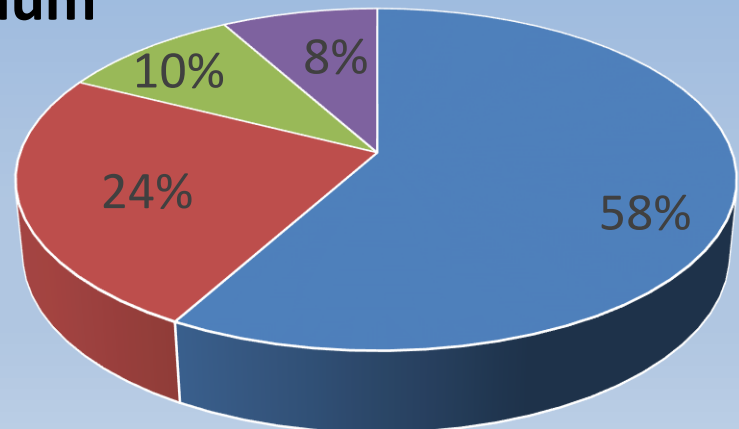
Total Fish Observed

Species	Coho 	Chum 	Unk.	Total Live Fish
Miller Cr.	60	61	27	148
Walker Cr.	15	13	3	31
Total	75	74	30	179

Coho



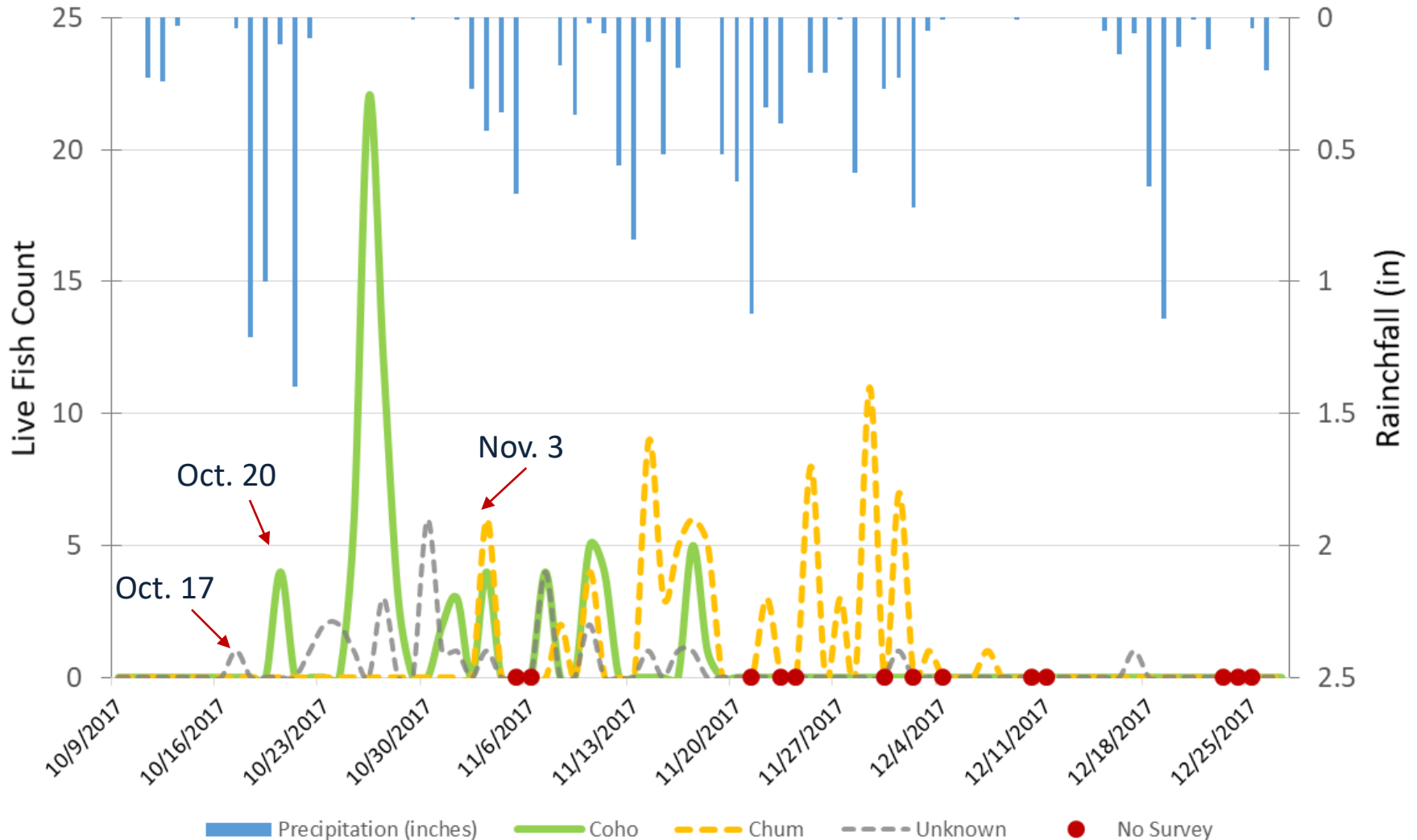
Chum



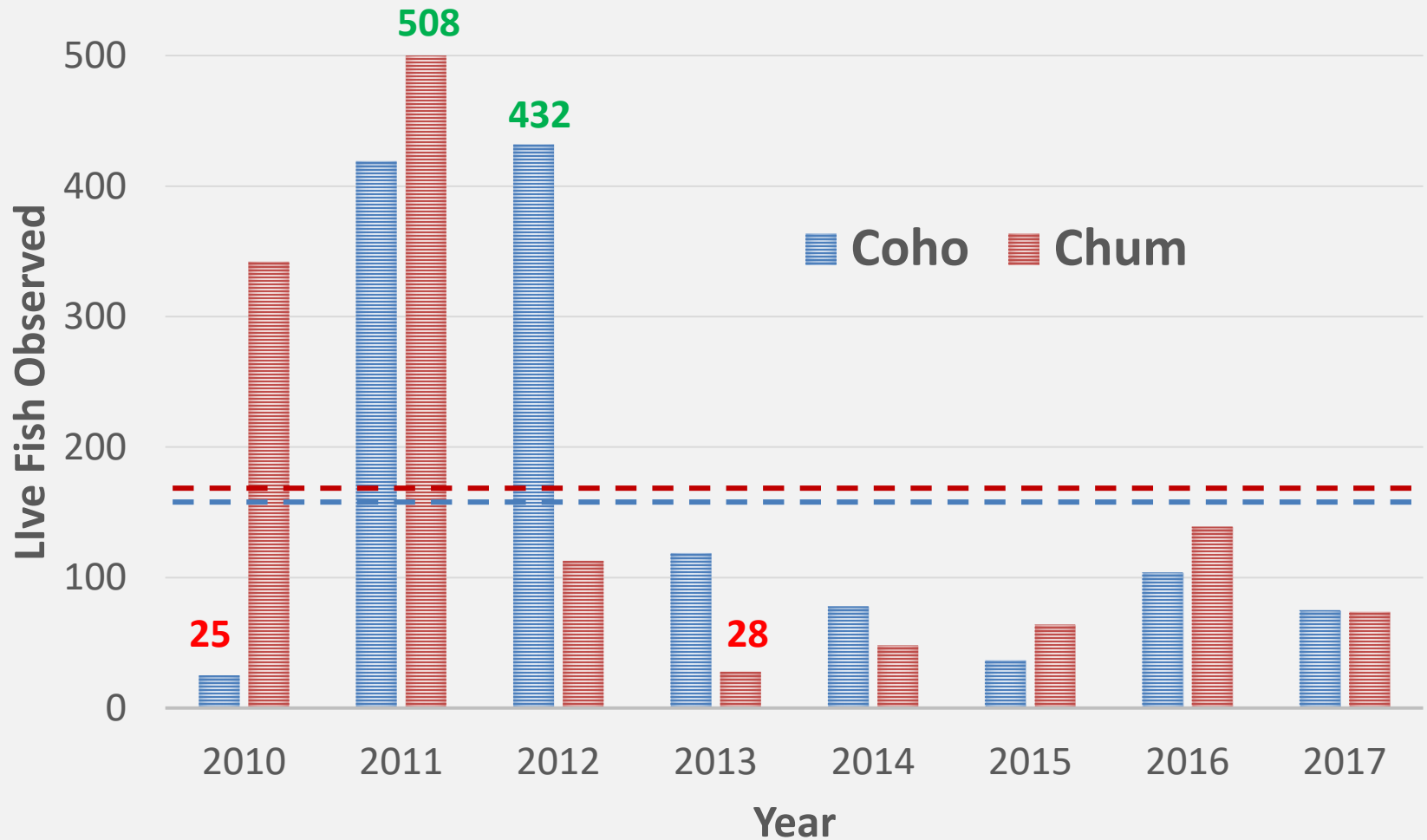
■ Upper Miller
 ■ Lower Miller
 ■ Upper Walker
 ■ Lower Walker

2017 Season Results

Daily Miller-Walker Salmon Count & Rainfall



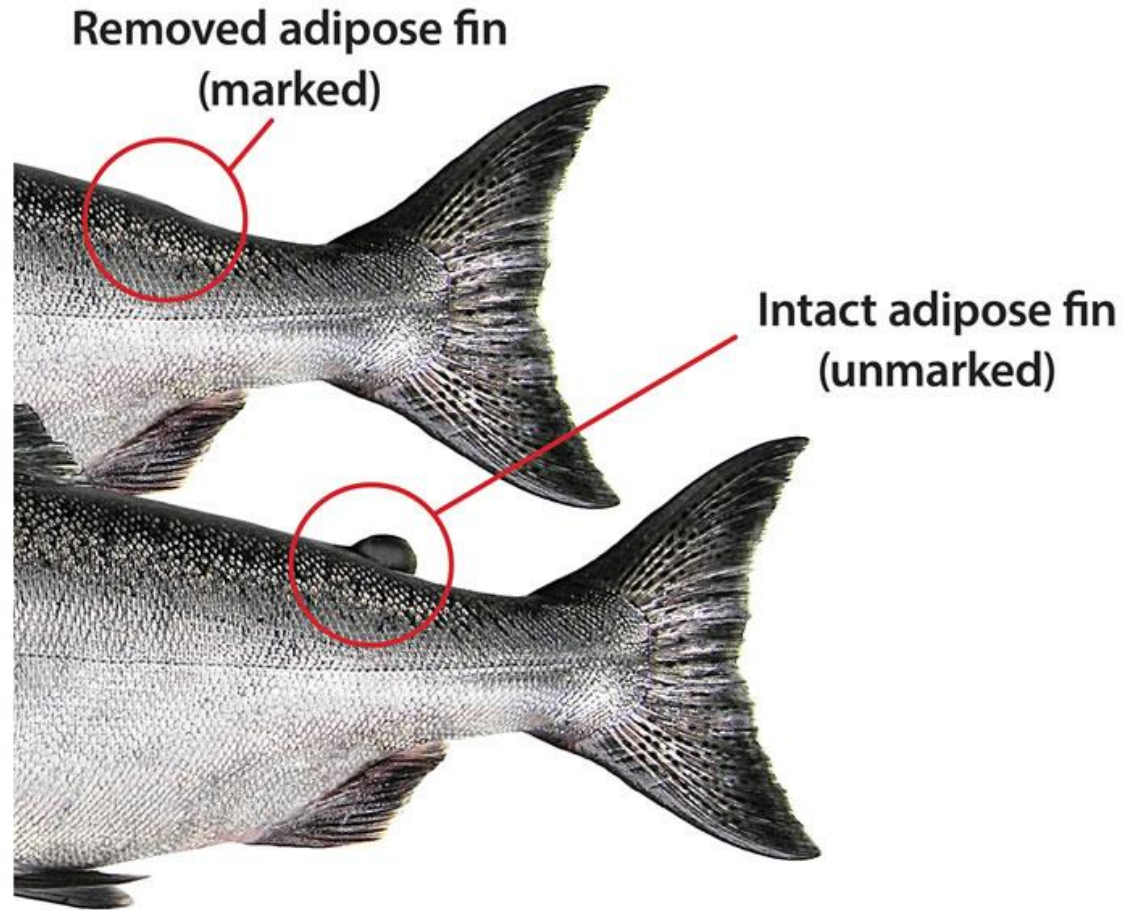
Salmon Abundance



Miller Walker Basin - Local partners working together for clean water and healthy streams

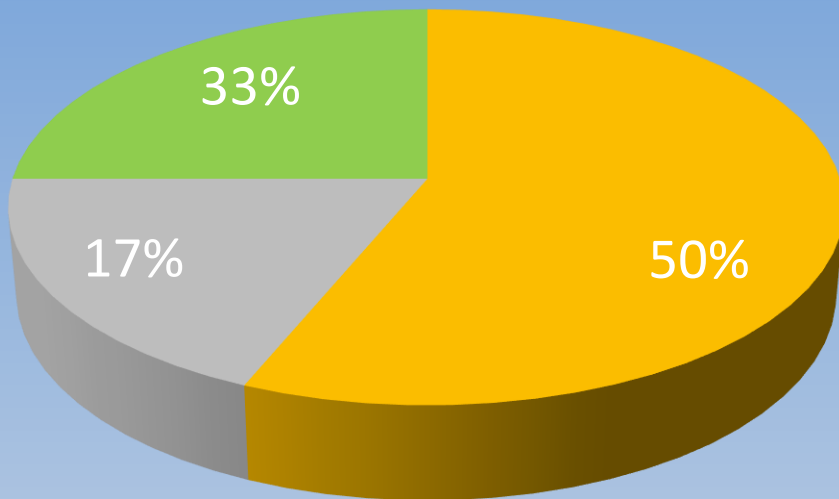
Salmon Origin (Hatchery/Wild)

Marked vs Unmarked salmon

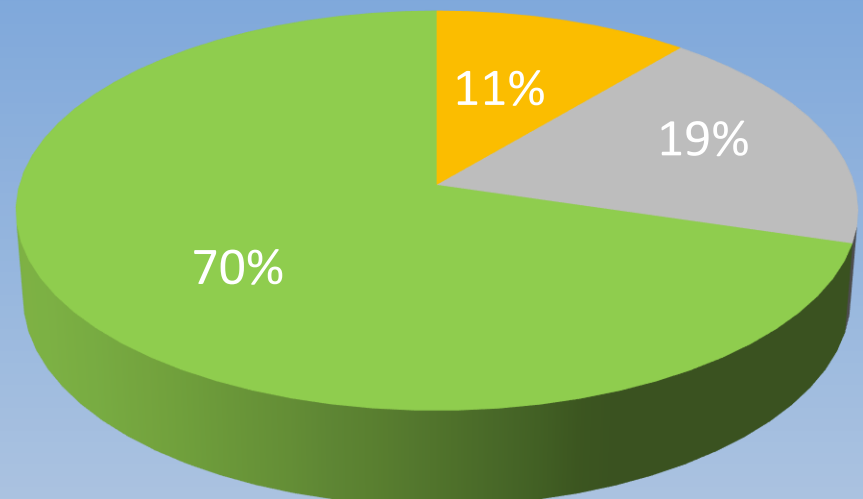


Salmon Origin (Hatchery/Wild)

Coho



Chum



■ Hatchery ■ Unknown ■ "Wild"

■ Hatchery ■ Unknown ■ Wild

Coho Pre-Spawn Mortality



Longfellow Creek, Puget Sound Keeper

Coho Pre-Spawn Mortality



*October 2017, Duwamish River
Puget Sound Keeper*

Coho Pre-Spawn Mortality



Nov. 13, 2017, Miller Creek
Zack McIsaac

Miller Walker Basin - Local partners working together for clean water and healthy streams

Coho Pre-Spawn Mortality



PSM – P. Silimperi



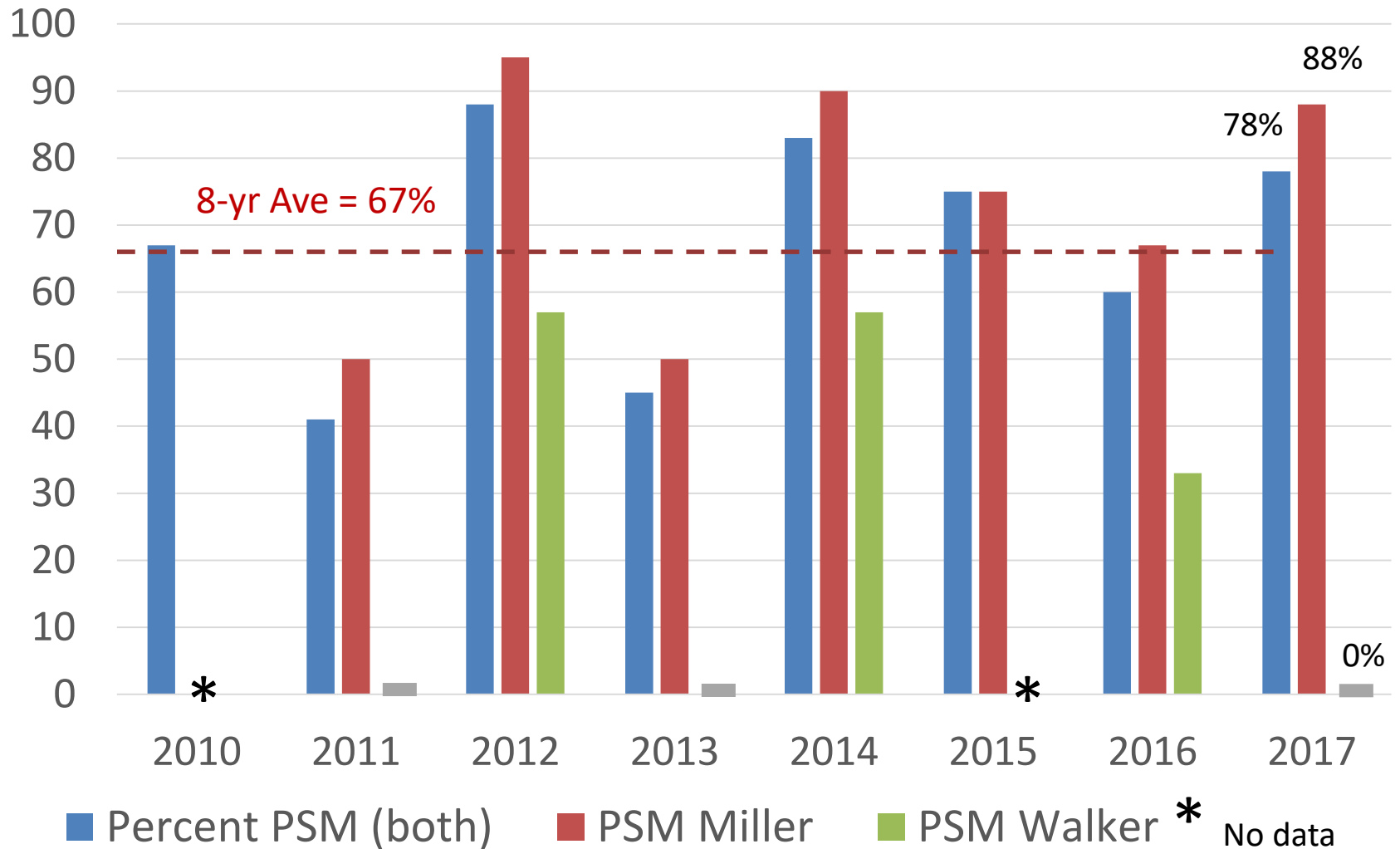
Success! -- L. Moyer



? -- M. Goehring

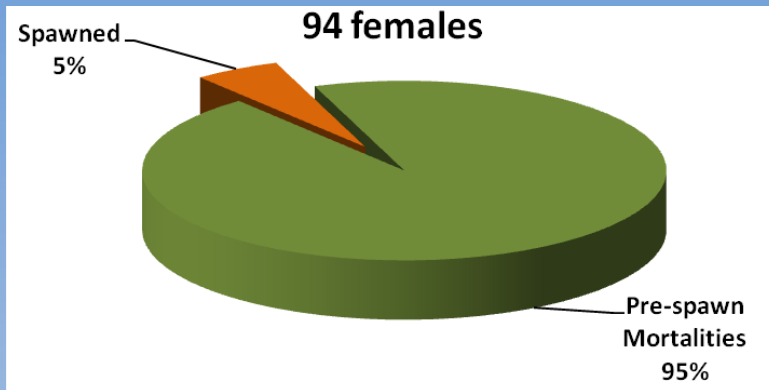
Miller Walker Basin - Local partners working together for clean water and healthy streams

Coho Pre-Spawn Mortality

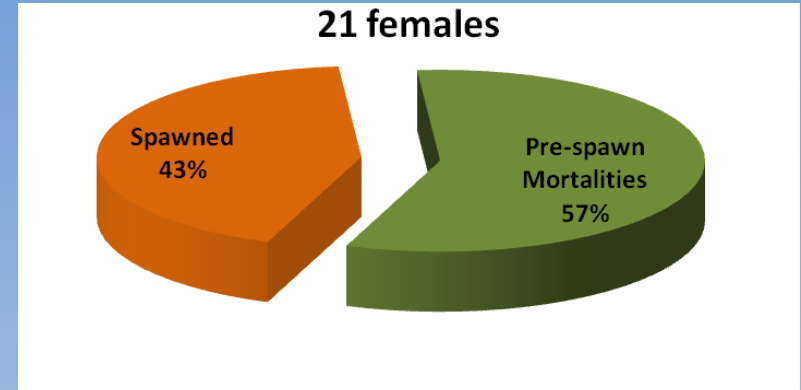


Regional Problem

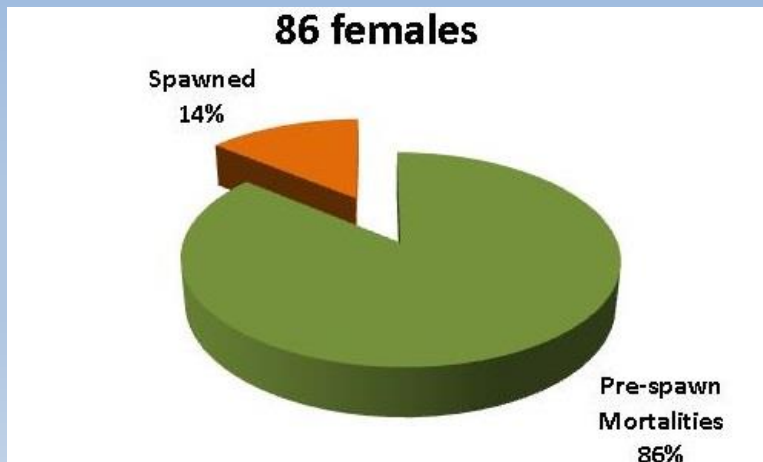
Miller Creek- 95% PSM



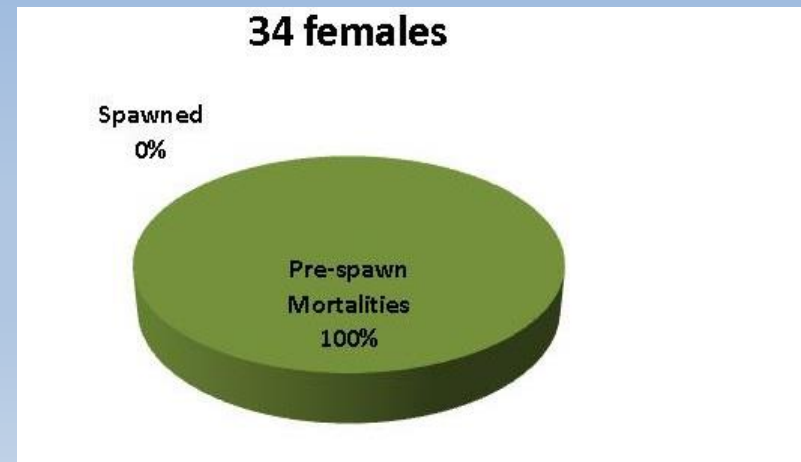
Walker Creek – 57% PSM



Longfellow Creek – 86% PSM



Des Moines – 100% PSM





OREGONLIVE
The Oregonian

Study links coho
runoff from W

A Regional Problem

risk for

A huge salmon die-off is happening -- and
our cars might be responsible

The Washington Post

in Puget
can spa

reams
stormwater

KOMO 10
Death by di

predicts where toxic r

in hours,

Kitsap Sun
f is killing coho

The Seattle Times
Toxic road runoff kills

study finds

myEDMONDS NEWS

Is runoff killing Edmonds salmon?

ic stormwater
food, sense predators,

Emerging Science: Runoff Toxicity



Photos: Tiffany Royal,
Northwest Indian Fisheries Commission

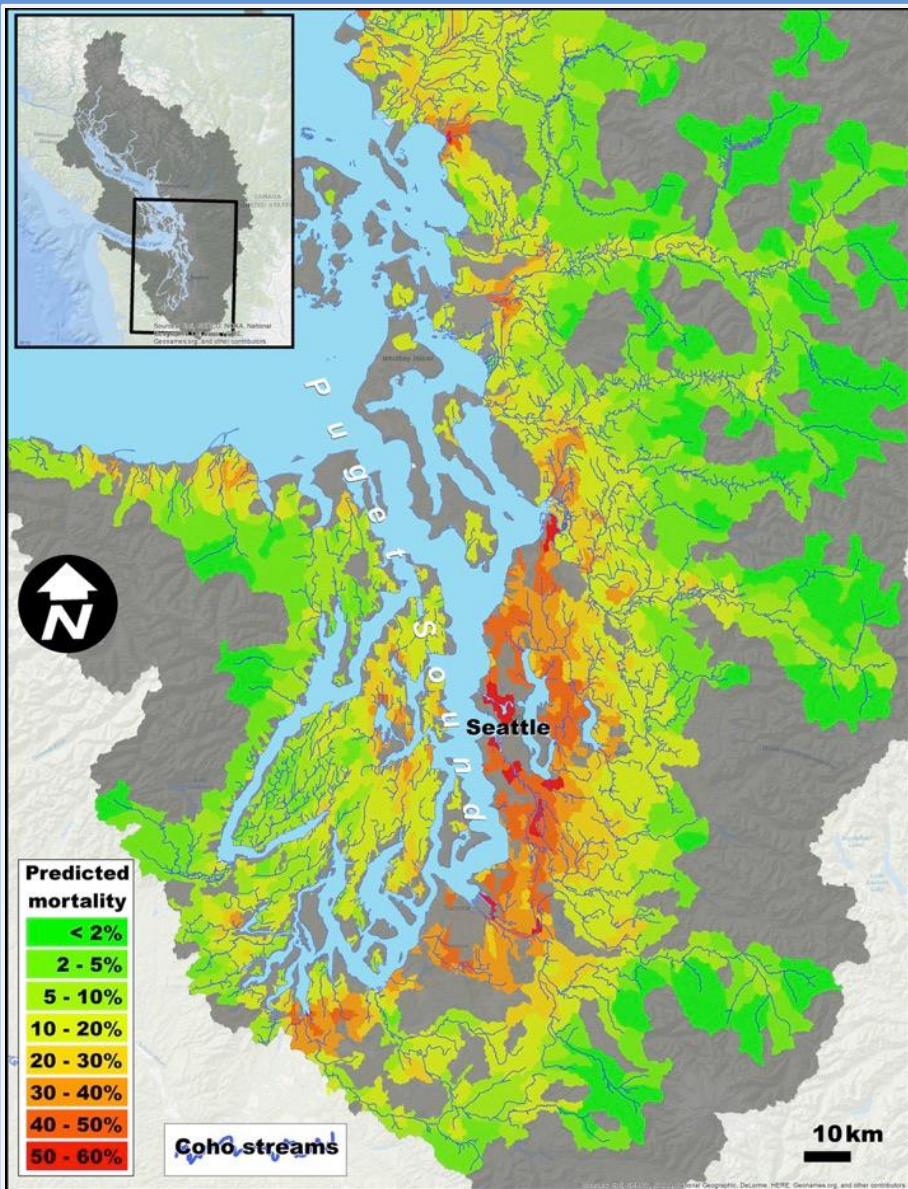
0% Survival

Spromberg et al., 2015. Coho spawner mortality in western US urban watersheds: biofiltration prevents lethal stormwater impacts. Journal of Applied Ecology



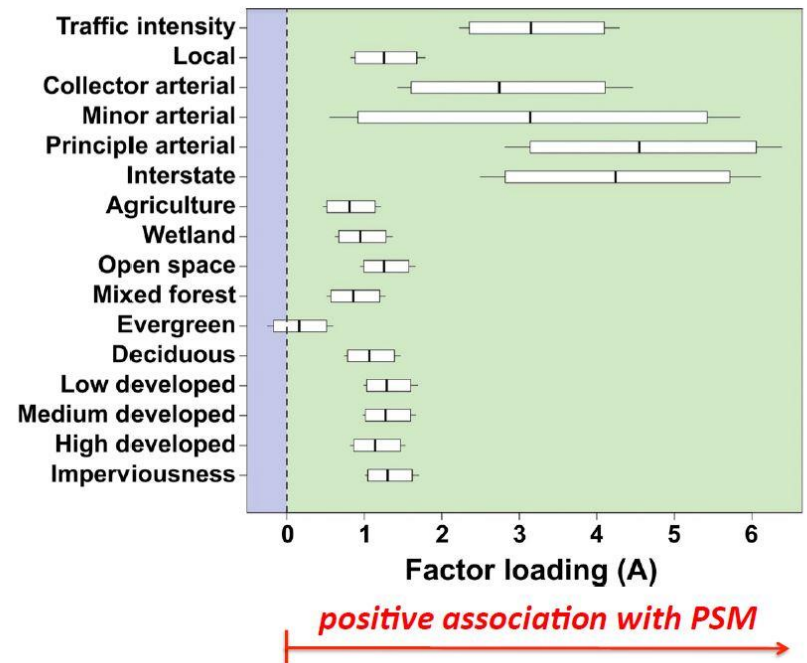
100% Survival

Urbanization Gradient



Feist et al., 2017. Roads to Ruin: conservation threats to a sentinel species across an urban gradient. *Ecological Applications*.

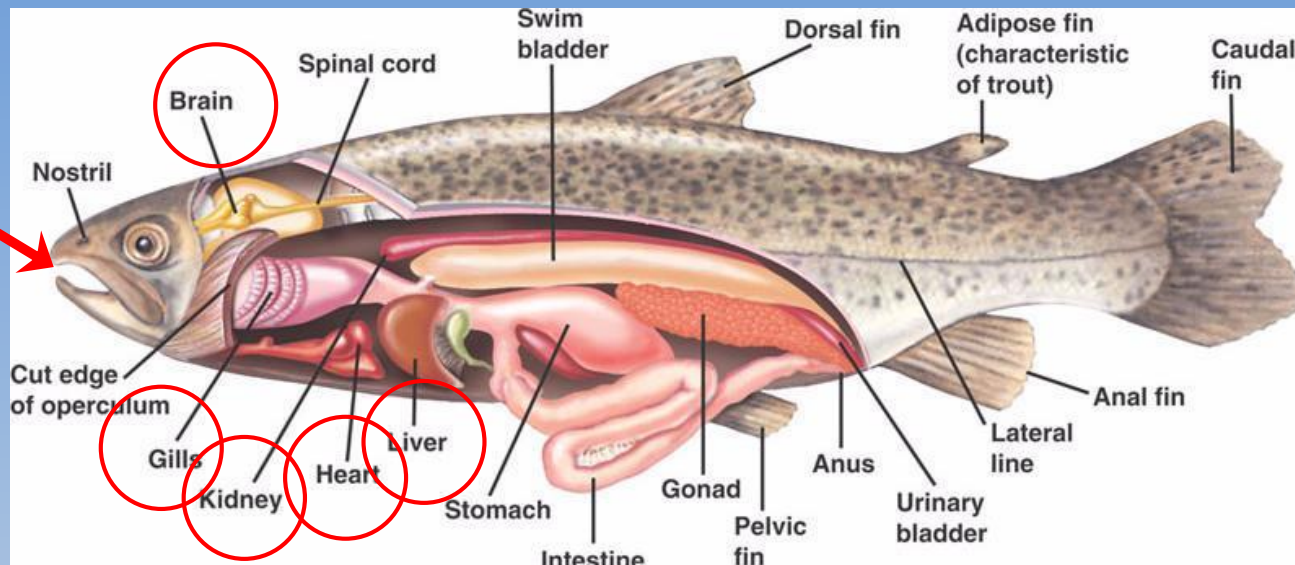
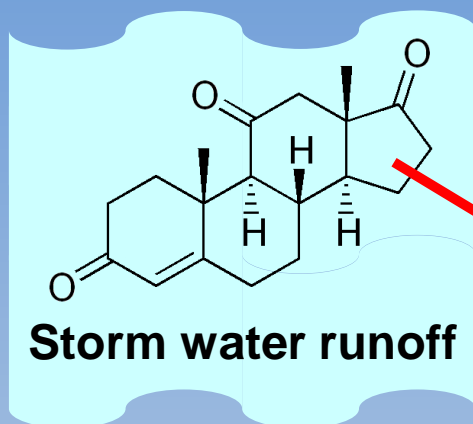
PSM association with land cover/land use



Nat Scholz, NOAA. July 26, 2017

Understanding Pre-spawn Mortality with High Resolution Mass Spectrometry (HRMS)

Center for Urban Waters: Ed Kolodziej & Kathy Peter



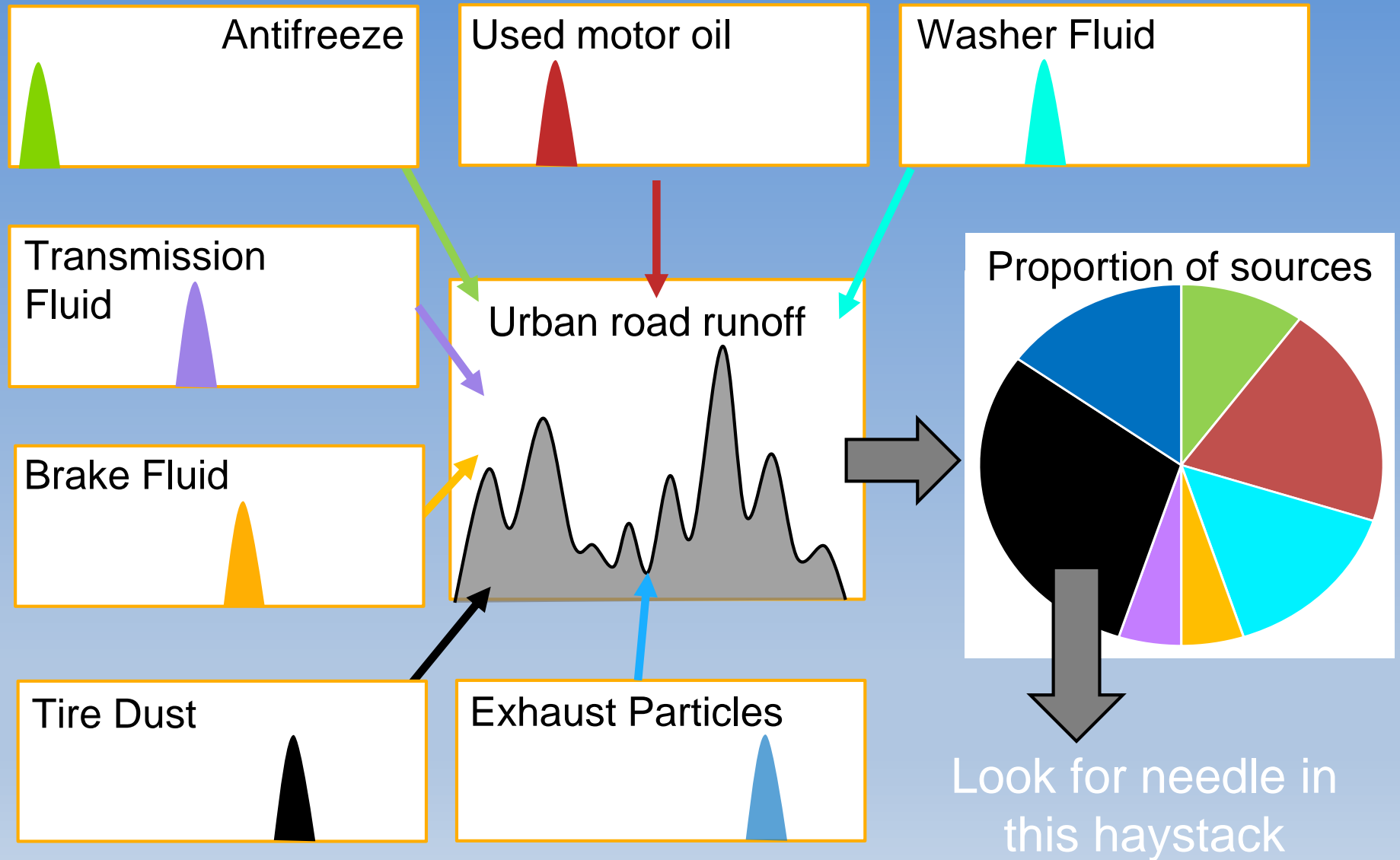
Assumptions:

- Gill uptake
- Dissolved Phase Toxicant
- Polar Toxicant?
- Conc. ~ ug/L?
- Others??

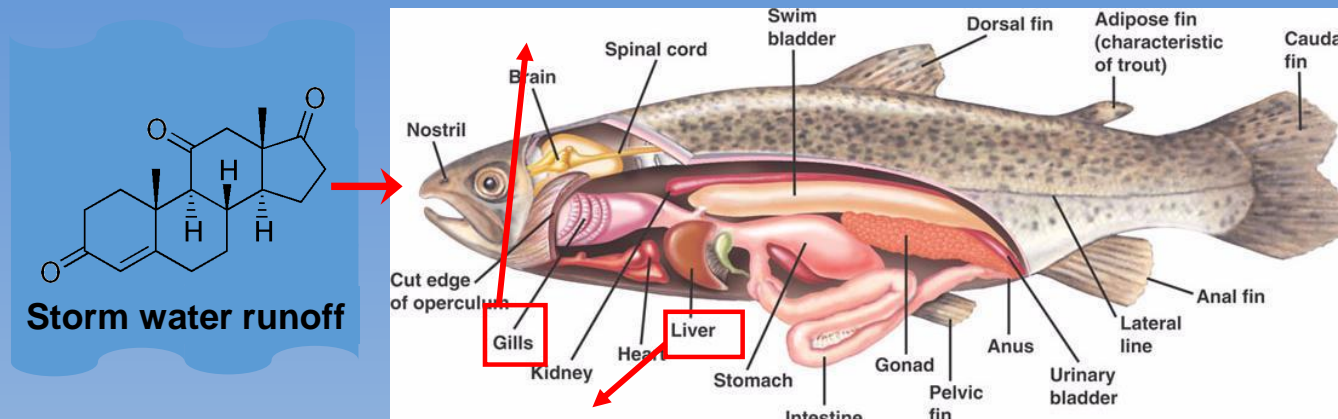


Exposure Pathway

Emerging Science: Road Runoff

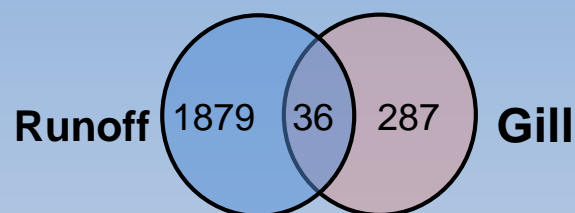


Detections from Paired Water and Coho Tissue Samples



2015 Adult Coho Exposures

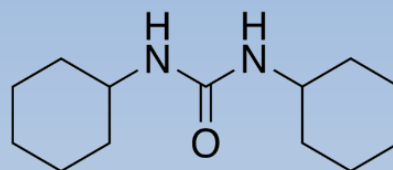
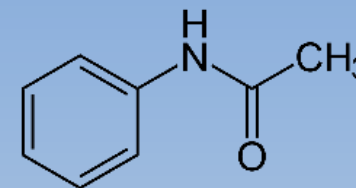
Prioritize candidates for further analysis



Acetanilide

(metabolic poison)

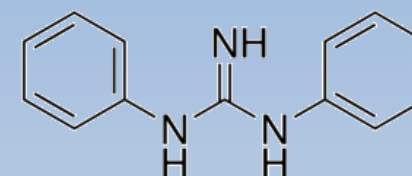
S1 in runoff, liver, gill



1,3-dicyclohexylurea

(plastics, tires)

S1 – runoff, liver, gill



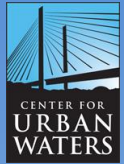
1,3-diphenylguanidine

(vulcanization accelerator)

S1 – runoff, liver

There are some chemicals from auto tires in both stormwater and PSM coho

Vehicle Source Dilution in Highway Runoff and Miller Creek



Source	SR520 Runoff (5 storms)		Miller Creek 10/18/2016	
	# Features	"Loading" (uL / L)	# Features	"Loading" (uL / L)
Tire dust	113	74 ± 14 mg/L	82	17 mg/L
Antifreeze (used)	10	220 ± 70	36	5
Motor oil (used)	35	14 ± 9	73	5
Windshield wiper	12	125 ± 40	4	186
Power steering	1	5 ± 3	6	0.28
Gear oil (used)	5	260 ± 135	3	56
ATF	1	64 ± 30	6	48

Based on entities "unique"
to each source

Based on all entities from
each source

Estimated Highway to Miller Creek Dilution Factor (for tires): ~5x

Emerging Science: Tire Dust

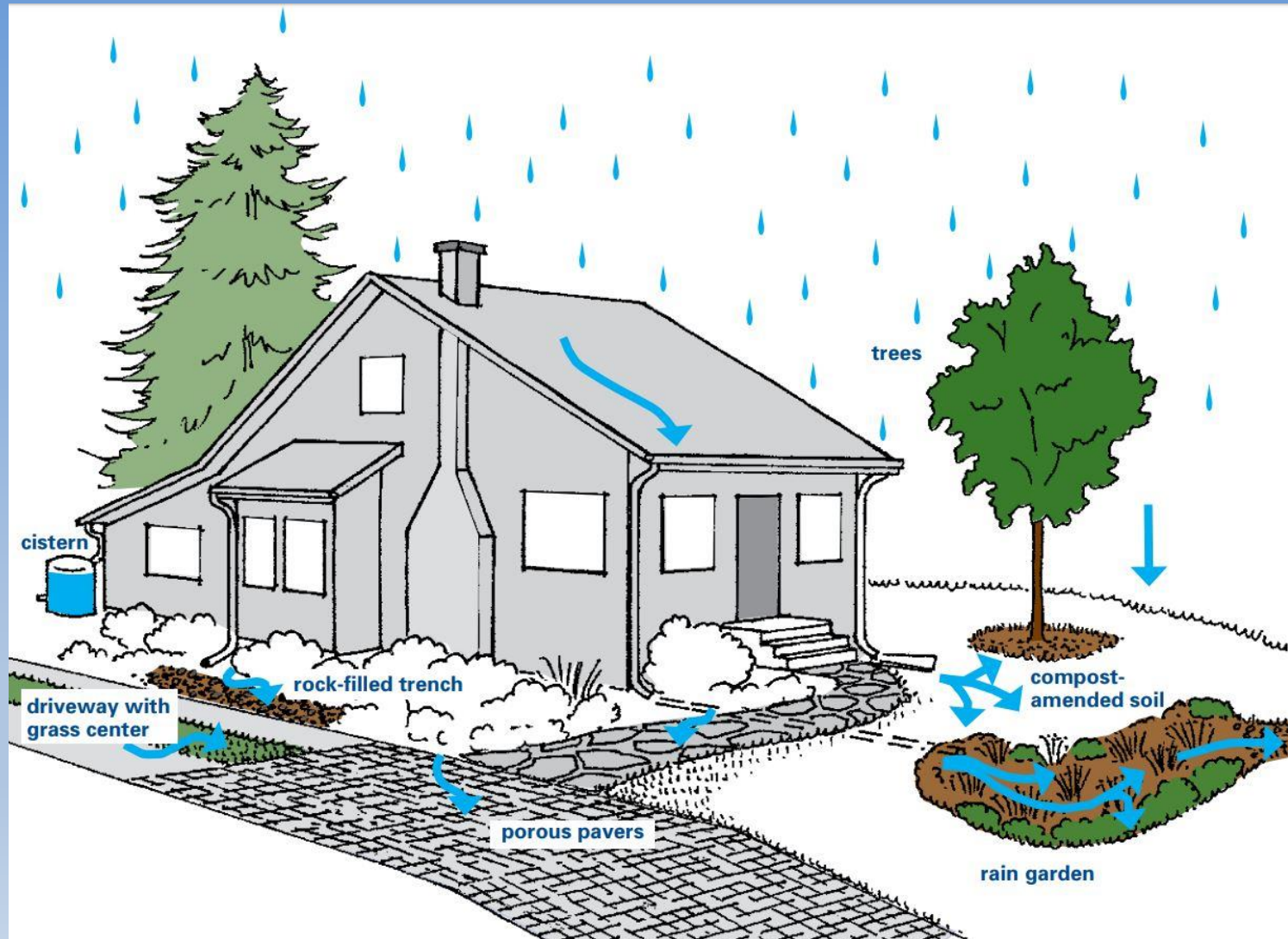


Similar to urban road runoff,
coho are sensitive, but *chum*
are not

Jen McIntyre | Dec 5 2017
Washington Stormwater Center

What can you do:

Promote infiltration to reduce runoff



What can you do: Volunteer



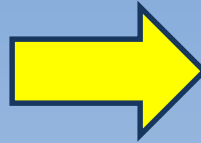
**Miller Creek Park,
Burien. March 31st.**



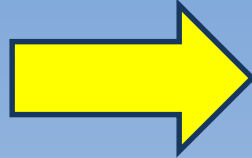
**Walker Preserve,
Normandy Park.
April 28th.**



What you can do: Invasive removal & native landscaping



SW Sanitary Sewer District



Photos courtesy of KCD

Only Rain Down the Drain

Puget Sound
Starts Here

Wherever you live, rain collects pollution from rooftops, pavement, and yards, and carries it into a creek or lake draining to Puget Sound. The High Point neighborhood around you drains to Longfellow Creek.

The **High Point Natural Drainage System** is a new and effective way to protect the living system that is the Longfellow Creek Watershed.



and Here
High Point

and Here
Longfellow Creek

and Here
Duwamish River



Puget Sound



Cleaner and clearer water reaches Longfellow Creek.

The **POND** allows dirt and pollutants to settle to the bottom before water is slowly released to the creek.

Longfellow Creek empties into the West Waterway of the Duwamish River and then into Puget Sound.

Here's what you can do to restore our waters.
Small actions add up to big changes!

Find out which features of the Natural Drainage System may work for your neighborhood or property.

- Slow the flow and let the rain soak in.
- Keep it clean and prevent pollution.
- Plant and restore our Northwest landscape.

What you do makes a difference! Volunteering is fun, too.
Learn more! www.seattle.gov/util/RestoreOurWaters



Thank You!!!

Surveyors

Landowners

Funding Partners

Watershed Residents



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